CLAIMS

1. A door handle device that is able to open a lock of a door locking means, which is provided to a door with a handle used for an opening/closing operation to lock an opening operation of the door, by an operation of the handle, comprising:

a piezoelectric sensor formed of a piezoelectric element fitted to the handle and having a flexibility; and

a controlling portion for receiving a sensed signal of the piezoelectric sensor generated by a touch on the handle to open the lock of the door locking means.

2. A door handle device according to claim 1, wherein the handle has a handle main body one end side of which is supported swingably to the door via a supporting shaft and other end side of which is moved in a pulling-out direction by a swing of one end side, and

the piezoelectric sensor is arranged on a surface of the handle main body opposing to the door to sense a vibration generated by a gripping operation of the handle main body.

3. A door handle device according to claim 1, wherein the handle has a handle main body one end side of which is supported swingably to the door via a supporting shaft and other end side of which is moved in a pulling-out direction by a swing of one end side, and

the piezoelectric sensor is bridged between the door and other end side of the handle main body to sense a vibration generated by a pulling operation of the handle main body.

4. A door handle device according to claim 1, wherein the handle has a handle main body one end side of which is supported swingably to the door via a supporting shaft and other end side of which is moved in a pulling-out direction by a swing of one end side, and

the piezoelectric sensor is arranged in vicinity of the supporting shaft of the handle main body to sense a vibration generated by a swing operation of the handle main body.

5. A door handle device according to claim 1, wherein the handle has a

handle main body one end side of which is supported swingably to the door via a supporting shaft and other end side of which is moved in a pulling-out direction by a swing of one end side, and

the piezoelectric sensor is bridges between the door and one end side of the handle main body to contact the supporting shaft and a top end of the piezoelectric sensor is inserted into an insertion hole formed in the handle main body as a free end.

6. A door handle device according to claim 1, wherein the handle is a door-integrated handle having a handle main body both ends of which are fixed to the door.

7. A door handle device according to any one of claim 2 to claim 6, wherein the piezoelectric sensor is provided in an inside of the handle main body.

8. A door handle device according to any one of claim 2 to claim 6, wherein the piezoelectric sensor is provided along an inner surface of the handle main body.

9. A door handle device according to any one of claim 2 to claim 6, wherein the handle is arranged in a position that is hidden behind an outer surface of the door when the door locking means is shut and is exposed when the door locking means is opened.

10. A keyless entry system comprising:

the door handle device set forth in any one of claim 1 to claim 9;

a vehicle-side transmitter/receiver mounted on a vehicle side;

a mobile-side transmitter/receiver carried with an operator; and

a controlling portion for opening a door lock when the mobile-side transmitter/receiver receives a password request signal that the vehicle-side transmitter/receiver transmits and then the vehicle-side transmitter/receiver receives a password signal that the mobile-side transmitter/receiver transmits;

wherein the control portion includes

a password signal requesting means for receiving a sensed signal of the piezoelectric sensor to cause the vehicle-side transmitter/receiver to transmit the password

request signal,

a password signal deciding means for deciding whether or not the password signal received by the vehicle-side transmitter/receiver and decrypted coincides with a normal signal set previously, and

a lock open instructing means for instructing the door locking means to open the lock when the password signal coincides with the normal signal.

11. A keyless entry system comprising:

the door handle device set forth in any one of claim 1 to claim 9;

wherein the control portion includes

a password signal inputting means for receiving a touch detect signal from the piezoelectric sensor to standby an input of a password signal,

a password signal deciding means for deciding whether or not the password signal input into the password signal inputting means from the piezoelectric sensor and decrypted coincides with a normal signal set previously, and

a lock open instructing means for instructing the door locking means to open the lock when the password signal coincides with the normal signal.

12. A keyless entry system according to claim 11, wherein the password signal is set based on a peak intensity and a peak interval of a vibration waveform generated by a rapping operation in a predetermined rhythm.

13. A keyless entry system according to claim 11, wherein the password signal is set based on a peak intensity and a peak interval of a pressure change waveform generated by a variation of a gripping pressure.

14. A keyless entry system according to claim 12 or claim 13, further comprising:

a disturbance sensor for sensing signal components except a signal as a sensed object out of a sensed signal of the piezoelectric sensor.

15. A door opening/closing device comprising:

an outer door handle and an inner door handle gripped in a door opening/closing operation;

a door locking means for locking a door not to be opened from a main body on which the door is closed;

a door latching means for latching the door releasably from the main body;

a door latch release operating means for releasing a latch of the door latching means in cooperation with an operation that is applied from an outer side or an inner side to open the door;

a door latch release signal sensing means for generating a signal in response to an operation of the door latch release operating means; and

a main body-side controlling means for controlling an open of the door locking means by a sensed signal of the door latch release signal sensing means.

16. A door opening/closing device comprising:

an outer door handle and an inner door handle gripped in a door opening/closing operation;

a door locking means for locking a door not to be opened;

a door latching means for latching the door releasably from a main body;

a door latch release/set operating means for releasing and setting the door latching means in cooperation with an operation that is applied from an outer side or an inner side to open/close the door;

a door latch release/set signal sensing means for generating a signal in response to an operation of the door latch release/set operating means; and

a main body-side controlling means for controlling an open and a shut of the door locking means by a sensed signal of the door latch release/set signal sensing means.

17. A door opening/closing device according to claim 15 or claim 16, wherein the door latch release signal sensing means or the door latch release/set signal sensing means senses solely a door opening operation or door opening/closing operation applied from an outer side or an inner side.

18. A door opening/closing device according to any one of claim 15 to

claim 17, wherein the door latch release signal sensing means or the door latch release/set signal sensing means is provided to a position from which a signal is generated by an action of a common portion that cooperates with a door opening operation applied from an outer side or an inner side by the door latch release operating means or a door opening/closing operation applied from the outer side or the inner side by the door latch release/set operating means respectively.

19. A door opening/closing device according to any one of claim 15 to claim 18, wherein the door latch release signal sensing means or the door latch release/set signal sensing means is provided in an inside of a door.

20. A door opening/closing device according to any one of claim 15 to claim 19, wherein the door latch release signal sensing means or the door latch release/set signal sensing means is formed of a piezoelectric element material, and the piezoelectric element material is deformed by an action of the door latch release operating means or the door latch release/set operating means to output an electric signal.

21. A door opening/closing device according to claim 20, wherein a bended portion to which a tension is applied is provided to the piezoelectric element material, and the bended portion is arranged to receive a deformation by an action of the door latch release operating means or the door latch release/set operating means.

22. A keyless entry system according to any one of claim 15 to claim 21, wherein the main body-side controlling means includes

a main-body transmitting/receiving means,

a password signal requesting means for receiving a sensed signal of the door latch release signal sensing means or the door latch release/set signal sensing means and then requesting a controlling means carried with a door opening/closing operator to transmit a password requesting signal via the main-body transmitting/receiving means,

a door opening/closing operator deciding means for deciding whether or not a password signal transmitted from the controlling means carried with the door opening/closing operator and decrypted coincides with a normal signal set previously, and

a lock open controlling means or a lock open/shut controlling means for controlling a open or open/shut of a door locking means when the password signal is normal.

23. A vehicle door equipped with the keyless entry system set forth in claim 22.

24. A building door equipped with the keyless entry system set forth in claim 22.